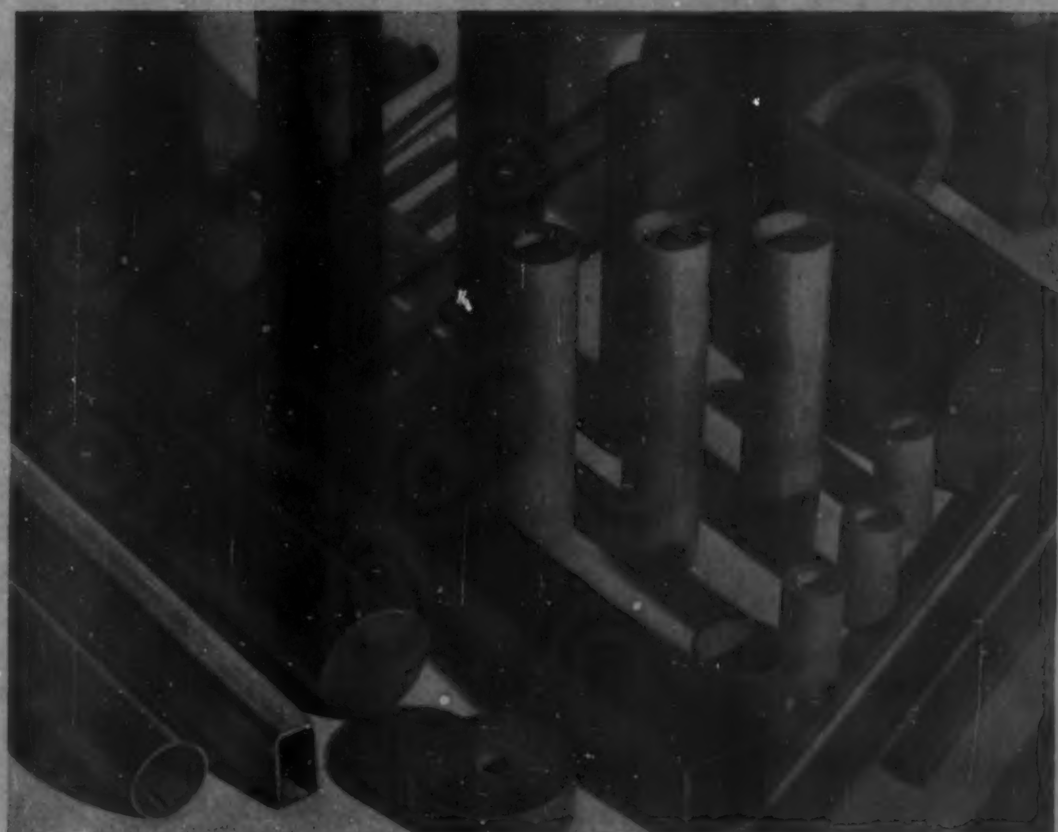
Plastic Products

Combining
"Plastics & Molded Products" and "Cellulose"



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Plastic Products

VOLUME IX NUMBER 2

Prices and Profits

INDUSTRIAL purchasing has two major objectives: quality and economy. Time was when there were strong supporters of the school which taught that quality was all-embracive. Today, on the contrary, many buyers only consider economy.

Under no conditions, in good times or bad, can either of these positions in its extreme be thoroughly justified. The point where cost and worth balance is almost undefinable; but it is extremely important to the industrial purchaser of plastic materials.

There is no blinking the plain fact that today the question of price is one that has a very great bearing upon any sale to the ultimate consumer. Bargain hunting is more than a popular pastime. As a result there has been a very great pressure exerted upon fabricators and molders and mixers instigating them to desperate efforts to bring down costs. These efforts have often concentrated in attempts to force down the costs of raw materials. This is but the logical, ultimate effect of a period of deflation, and quite naturally the prices of raw materials have moved downward in response to these forces.

Cheaper plastics are very much needed. The tremendous progress that has been made in reducing the costs of plasticizers, solvents, molding powders, synthetic resins, fillers, and colors during the past dozen years is but a promise of much more that will doubtless be done in the future along these lines. Again we are dealing with a natural economic trend; but in times of stress we ought not to overlook the fact that the plastic materials do not depend solely upon price for their appeal.

In the plastic industry there is no such thing as "loss-leader merchandise" and the user of plastic products who buys on price only is very apt to be creating a very flourishing replacement market,---for his competitors who are making a better product at a fair price.

Some Hints on

Molded Design

By F. E. Brill
General Plastics, Inc.

A CURIOUS thing about the plastic industry is the complete lack of artists within its ranks. Aluminum has its Russell Wrights, excellent artists who turned machine-craftsmen and made the world conscious of aluminum as a decorative material. Copper and brass has its Walter von Nessens. Other groups of fabricators have had aesthetes among them. But we stand alone: artless, with practically every honest decorative handling of our material coming from outside our industry.

But why all this propaganda for beauty in plastics, you say? For the sole sake of profits. To give our materials an identity, to make them desirable to the consumer and therefore to industry-at-large, to open new markets formerly closed to us because of poor handling.

Pleasing appearance does influence sales. So, since in business, profit is king, we must look upon this beauty business in the cold light of sales appeal, throwing out all of our irrelevant personal preferences. And since we have no artists among us, we must entice outside talent to work for us, concentrating our own efforts on honest handling of the splendid materials we now have.

Sales Only Yardstick

Having established the premise that sales are the only measure of a product design's worth, we can start looking at the successful and unsuccessful molded products on the market to see what we can learn from analysis of their design.

We are almost convinced that imitating older materials is sheer folly. The bargain counters are loaded with walnut and mahogany moldings that are not selling. If we reason a bit, we can see that the charm of wood is its depth of finish, the translucent sheen that permits the reflection to come up softly from beneath the actual surface. We simply cannot get that in opaque moldings, so we fool no one. And when we imitate wood or other materials and the consumer realizes it, we confess that we are sneaking in as a cheaper substitute.

Let us look at contours. Simple and clean-limbed moldings are selling better than fussy, odd-shapes. They are easier on the eyes, and people prefer restful contours. This simplification idea sprang up in Germany, when they had no money for decorating things; and they found that, if they made their products and buildings symmetrical, they could dispense with applied ornament. Of course the minute you eliminate applied ornament you make the contour all-important, for the eye has nothing to attract its attention from the outline.

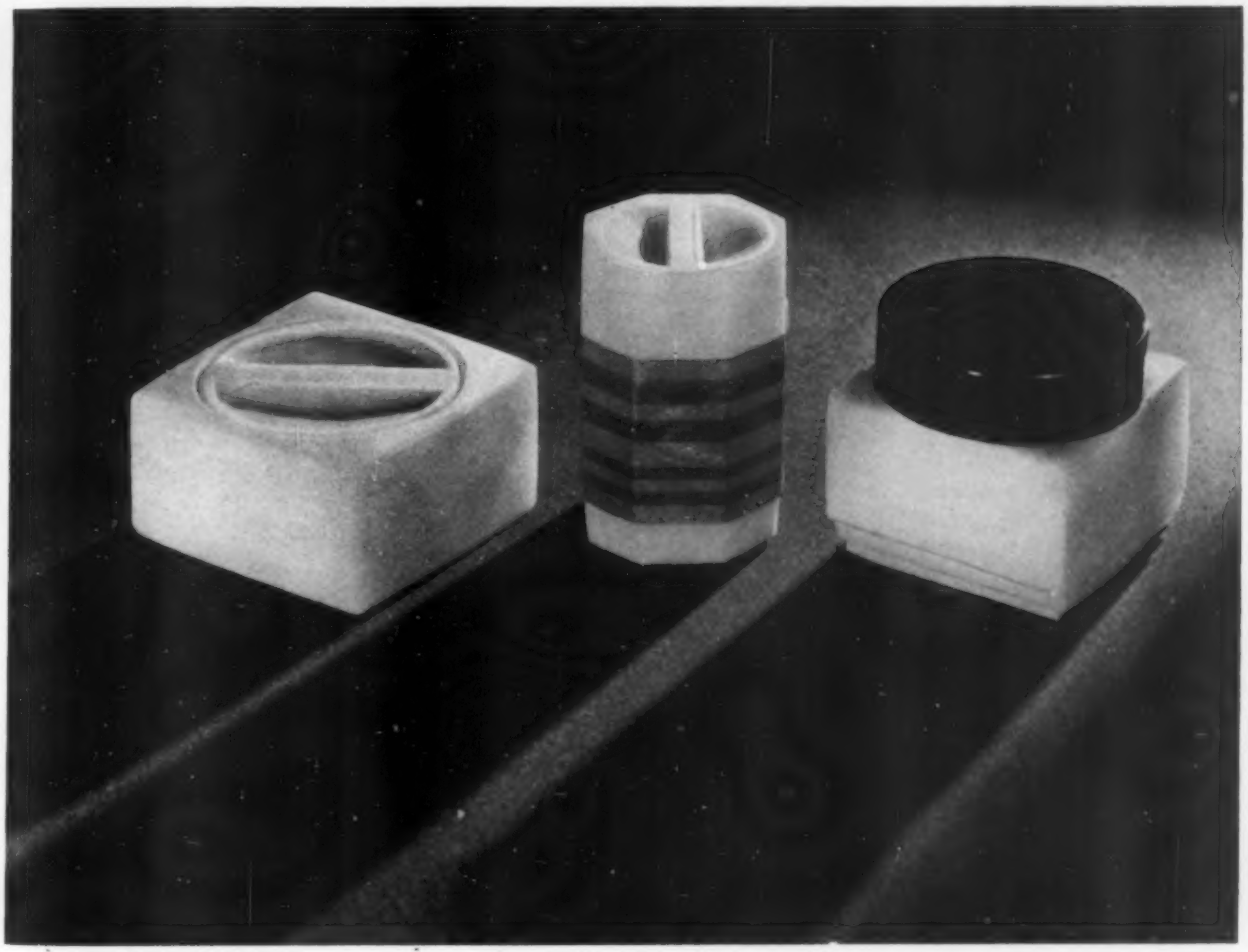
Teague and Sinel, two of the leading industrial artists, have several tricks in designing molded plastics. On his famous barometer, Teague had the molder buff down the black molded case to a satin finish, and against this dull surface he fastened two very shiny chromium strips, corrugated to catch the lights. The eye is grateful for the variation in lustre. Sinel had a similar problem with the Acousticon parts, also molded of black phenolic material. He engraved the surface in several places with shallow geometric lines, all cut into the mold by machine, so that the surface took on a sparkle where it caught the light, contrasted with the dull areas. The piece looks much smaller and very rich. Of course, this sort of thing takes an artist's touch. A layman can make a bad botch of mold engraving.

Henry Dreyfuss has some bold theories of plastic design. One of these is the dull-and-shiny-contrast. Intelligently planned designs, stripes, names, etc. can be sandblasted into the mold so that they come out dull on the molded piece and contrast with the polished part. Also, says Dreyfuss, "a molded piece is not complete in itself, and always needs some other material like metal for contrast." This last statement is open to question, but there is much truth in it.

When it comes to color, many agree that color in plastics, like applied decoration, came as a great boon to amateur designers. They could cover up almost

any sort of a poor design with a weak, vague color, probably a pastel, which would, by reason of its weakness, make the contour of the piece seem unimportant. It's a lazy device that often gets by. You can prove this by noting that pieces which look well in black look well in color, but those which look well in color often look bad in black.

Improvements in metal inlay materials are being made rapidly. In fact, the materials seem to be getting ahead of the molding technique and the molders' appreciation of their possibilities. Electrolytic inlays can be bought in stock and special designs economically in small quantities. Gleaming chromium and



satiny aluminum can also be bought in sheets all ready for stamping out and molding in, at a very low cost. Then there are the more recent colored metals with a shimmering translucent surface, called Alumilite, which, when properly used, will relieve the monotone of color and texture of a molding, and give real beauty and richness. In many cases a metal-inlaid molding in black will be far more pleasing than a plain, colored one, and can be produced at a lower cost.

Contrast thus seems to be the greatest immediate need in molded pieces. Every molder's representative should have in his briefcase several discs with metal inlays molded in, for they illustrate contrast perfectly. Then, too, perhaps we are wrong in spending so much time polishing molds, for often, especially on cylindrical pieces, the scratch marks of the cutting machine when reproduced on the molded piece closely resemble the satiny finish of spun aluminum, which we know people like. This is somewhat the type of finish that Teague gets by laboriously buffing off the lustre produced by laborious previous polishing. It is very easy on the eyes when contrasted with bright metal, but it should be more easily attained. Experiments in partial mold polishing should be interesting.

The other devices for getting contrast into molded objects are well known. Wiped-in color is one, and a good one if handled correctly, but in all of these things, a certain sense of fitness is necessary. The average stock metal inlay, and the stock engraved designs from the average artist's or draftsman's brain all too often deal with such time-worn motifs as colonial silhouettes and Scottish terriers. How anaemic they look next to George Switzer's Nocturne tray.

Why not make decoration symbolic of our modern age, using simple machine-cut forms to get that verve and dash which is so expressive of contemporary life? No artist living has ever exhausted the thousands of beautiful forms possible by simple combination of circles, squares, and pyramids which can be produced so easily and effectively by machine.

An Historical Survey of

COATINGS

By Bradford S. Covell

THE art of compounding and applying colored surface coatings is one of the earliest forms of human endeavor. In the Paleolithic age, some 50,000 years ago, man recorded his first crude attempts to cover surfaces with colored liquids for decorative purposes.

The first records of such coatings were discovered during the past century in France, Spain and Italy. In exploring prehistoric underground passages strange colored figures were found on the sides of caves near the earthen floor. These first pictures were in three colors—red, yellow, and black, and were found in a remarkable state of preservation.

For any paint to withstand a 50,000 year aging test speaks well for the technique and materials employed. Although it is impossible to prove chemically, it is probable that these ancients used some exceptionally durable binding agent which today is not known to us. That some sort of water extract of roots was used is fairly certain. The red and yellow pigments employed then are still in use, the yellow ochres and the iron oxide reds forming today important pigments. Thus, in its essential primary specifications which called for a pigment (earth), a volatile thinner (water), and a binder (an unknown root extract), this stone age paint is similar to practically all colored coatings made today.

Similar records of prehistoric attempts at pictorial design were found also in caves in Arizona and Mexico. As there is no record of the mysterious origin and history of these races in ancient times it is impossible definitely to date the start of the coating industry in this hemisphere. From geological studies of strata containing the earth colors used it is generally accepted that these American painted figures date from about the same time as the first European attempts at interior decoration. The designs and materials are somewhat similar and it is thus interesting to note, that, competitively speaking, the coatings industry in both hemispheres started, as it were, from scratch.

The art of mixing decorative coatings found its way into Egypt about 8000 B.C. and to this race much is due for the development and expansion of the art. Much of the knowledge on which the earliest history of the human race is based, is due to the lasting qualities of the materials used by the Egyptians in their hieroglyphics and figures. Many new colors were made available by the discovery of new earth pigments until by the year 1000 B.C. almost as many colors were available as we have today. The Egyptians did not confine their efforts to coloring mediums alone, but must also have done considerable research on improving the binders or vehicles. Many experiments were conducted on water soluble organic materials which would act to bind and hold the colors in place as a glossy coating, after the evaporation of the water solvent. This is exactly what we expect of our various binding mediums today. It was found that sap from the Acacia tree yielded a gum or resin which was tough, glossy, and of good film forming

In this, the first of Mr. Covell's articles on coatings, it is interesting to note how lacquers have run the gamut of time from 8000, B. C. to 1933, A. D., and how greatly chemistry has advanced this ancient art, furnishing new materials that demand new formulas and open up new uses.

properties. Thus gum arabic was discovered. This was in great demand and, as it was easily obtainable, soon attained the distinction of being regularly specified as an ingredient of all good paints. Gum arabic is still used today.

As in modern paint research, the Egyptians were evidently extremely conservative and sure in the application of their new discoveries and developments. Thousands of years appear to have elapsed between the discovery and the wide application of some of their materials. Also, as in modern research where the discovery of one new class of materials accelerates the search and study of all possible similar materials, so

Lac is carried to its place of export on camel back, and shipped in gunny sacks weighing 164 pounds each when filled.

it was in Egypt. Other trees and plants were investigated and many new natural resins from sap and fossil gums such as amber, found their way into the specifications. One of the earliest colors used by the Egyptians was a very beautiful blue made by grinding lapis lazuli, a semi-precious mineral of gem-like properties. Our present day ultramarine pigment is an imitation, and an inferior one, of this much sought for color, still greatly in demand by artists.

It was about this time (1000 B.C.) that the Egyptians made their greatest contribution to the coatings industry, their development and perfection of varnish. Linseed oil and various natural gums and resins were the ingredients. How well they understood the art of combining these materials is evidenced by the wonderful preservation of the mummy cases now in our museums. The cases, and sometimes the mummies themselves, were varnished, this application being the first known use of a protective coating. The exact methods used to combine the gums and oils was a carefully guarded secret. Very elaborate but incomplete directions have come down to us in ancient writings. Likewise the exact method of applying these first solventless varnishes is not definitely known, but it is thought that the palm of the hand or the thumb was first used as the brushing medium.

It is interesting in passing to note the derivation of the word "varnish." A beautiful amber haired queen of the Egyptians, Berenice, is responsible. The similarity in color between her hair and amber was evidently so pronounced as to be striking. Amber was extensively used in varnish. The word "berenice" was changed to "vernix" by the early Romans, to "vernice" by the later Italian artists and it is as "varnish" that we know it today.

From Egypt the development of coatings was taken up by the Italians who, thanks to the needs of the great artists of the Renaissance, developed many new and beautiful colors. Their oil-gum combinations were for some purposes, perfection itself, particularly the varnish developed especially for violin coatings. These have never been equalled and their preparation is a lost art. In this connection a recent press dispatch told of research work now being undertaken by the University of California on behalf of a group of violin makers, to try and learn the secret of these old violin varnishes.

During these centuries of gradual improvement of coatings in Egypt, entirely different materials were in use in the far East. These were japans, or oriental lacquers. That they are thousands of years old is certain; they may even antedate the Egyptian varnishes. The japans had attained a high state of perfection when Japan first made contact with the outside world in the middle of the last century. In spite of their name these coatings did not originate in Japan. The lac tree, whose sap was an important constituent of the original japans, was imported from Korea to Japan in the third century. At that time in China and Korea the art of japanning had reached a state of perfection which has never been excelled and seldom equalled. Many centuries of research must have been necessary to attain such beautiful coatings. The lac tree, referred to above, is the producer of our present day shellac. An insect plays an important

A forest of lac trees in India, where myriads of tiny red insects swarm over the branches, feed, propagate and die.

part in making shellac available. The lac tree, its bark punctured by numerous tiny insect stings or bites, exudes sap freely. This sap dries, is collected, and melted up and strained through gunny sacks. This removes dirt and foreign matter in the form of bark, twigs and hundreds of bodies of dead bugs, caught in their own sap, so to speak.

For many centuries the coatings industry remained dormant insofar as new advances were concerned. Fossil gums, linseed oil, pigments, and solvents were the sole constituents of varnishes and paints from

1800 B.C. until about 1860 A.D., an important date in the history of coatings, for at that time nitrocellulose lacquers made their appearance.

These first lacquers, made of high viscosity cotton, were thick crude mixtures, used for the most part as clear coatings. Their main field of application was in the metal industry to prevent tarnishing in the air. The solvents were alcohol and fusel oils. To overcome the natural brittleness of the nitrocellulose, shellac and natural gums were used as the first plasticizers. Although this coating prevented tarnishing, the lacquer itself was far from stable. The shellac, gums and nitro-cotton slowly evolved an acid effect which in time caused a greenish cast to appear on brass and copper objects so coated. This color effect is very noticeable on curtain rods and various fixtures made during that period. The high viscosity cotton available made it necessary to thin the lacquer considerably to bring the viscosity down to a point where it could be readily applied. The addition of pigments and other solids so thickened the cotton solution that the further thinning necessary resulted in such low solid content that very little covering or hiding power could be obtained. This coverage difficulty, which necessitated many coats, greatly limited cotton lacquer, so that its use was confined to the relatively narrow field of clear protective coatings in the metal industry. For about sixty years little was done to improve lacquers. No one dreamed of the tremendous developments "just around the corner" which were to completely revolutionize the industry.

20th Century Developments Rapid

With the beginning of the 20th Century new discoveries came so rapidly that where there were three or four materials to choose from, today there are literally hundreds. The changes have been so rapid, and the effects produced so great, that the users of coatings have been left in the rear in their knowledge of the available products. Today so many different kinds of coating materials are offered that they are often at a loss to know which to try. It is with the hope of offering some assistance and guidance to users of coatings in their choice of the many types of paints, varnishes, enamels and lacquers now being produced, that this series of articles is written. To procure numerous samples is a simple matter. Manufacturers of coatings are most obliging in this respect. But how much simpler and more time-saving for all concerned if, instead of blindly testing materials which are basically unfitted for the job on hand, the coater confined his efforts to a few samples collected by a specific, intelligent request.

To turn from generalities to history, the start of the century found us plugging along with slow drying, costly linseed oil-gum varnishes, black japans, oil paints, and the newer clear lacquer solutions. The first important change was the introduction of China wood, or tung oil. With proper cooking this oil has the advantage of greater gloss, hardness and toughness obtained with cheaper gums than could be used with linseed oil. The latter required the more expensive, less uniform, fossil gums, the deposits of which were rapidly becoming exhausted after so many centuries of use. China wood oil, on the other hand, is not at all particular with which resins and gums it combines, and even with cheap pine rosin gives a really fine coating compared to the older type of varnish.

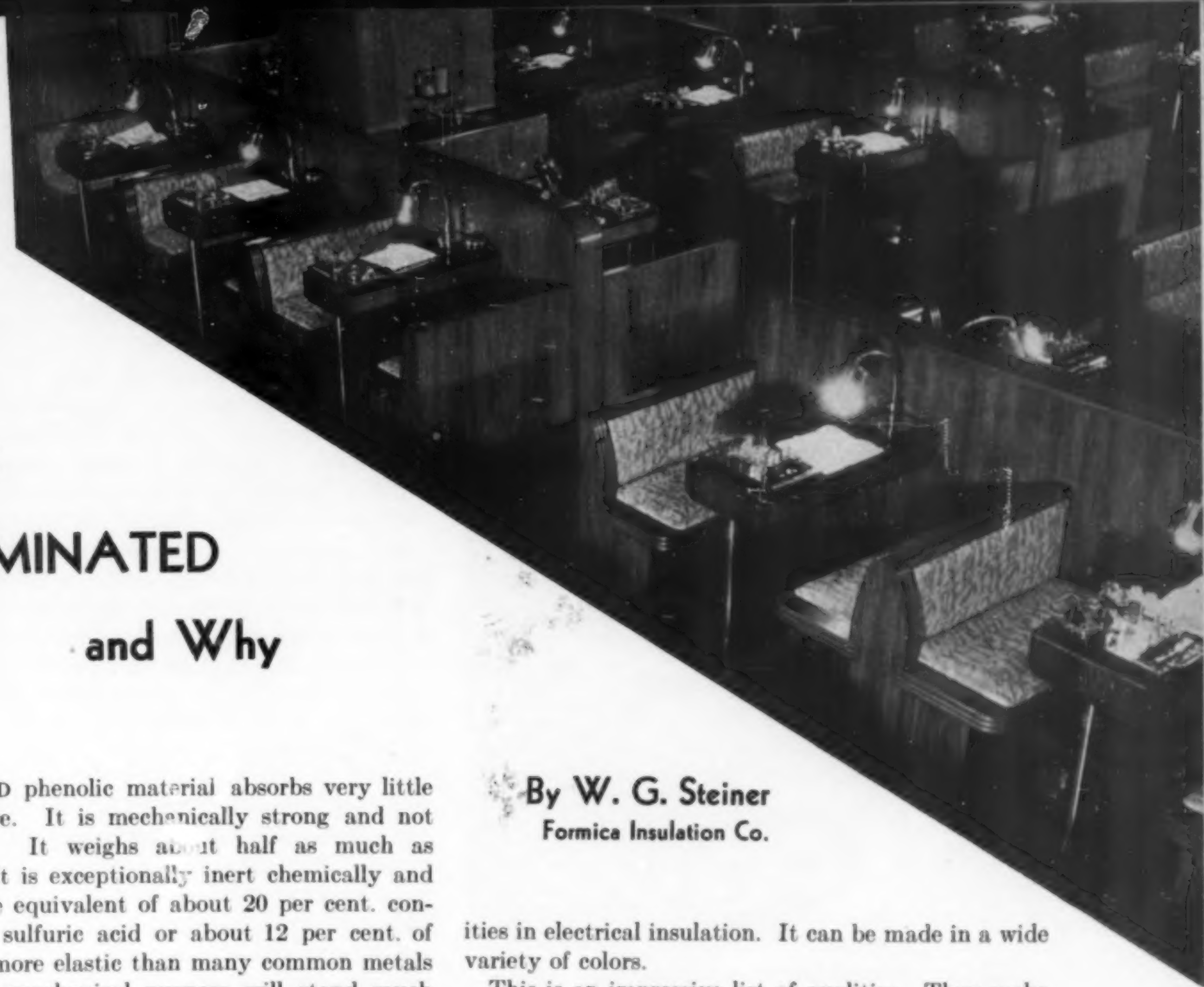
For some time past chemists had been delving deeply into the mysterious realm of synthetic resins. These had been often noticed in laboratories as an unwelcome result, a blank-wall ending of many an experiment in organic synthesis. How Dr. Baekeland and his associates took these shapeless, soggy masses and rescued them from the laboratory slop-pail to found a new and major industry is a fascinating story which cannot be told here. This development of the phenol-formaldehyde, or Bakelite type resins, led to the large group of synthetics which have caused the major advances in varnishes and enamels, and which have been of great value in nitrocellulose lacquers.

First Synthetic Resin

Unrelated to these phenolics, which were to follow shortly, is the first synthetic resin, ester gum. By heating rosin with glycerine a new and better product is obtained which imparts finer qualities of weathering and water resistance to varnish when cooked with tung oil in place of rosin. By varying the grade of rosin and the time and temperature of cooking, a whole range of ester gums is available with various degrees of whiteness, melting points, and other fundamental properties.

The phenolic resins, were first used extensively in molding compounds. This type resin is insoluble in the varnish oils so, except as a spirit solution which dried to leave a brittle film, did not enter into the coating industry. After years of research a way was found to melt up and combine phenolics with hot China wood oil to make exceptionally fine varnishes and enamels. Not to be confused with "Albertols" or so-called modified phenolics, these all phenolic varnish resins, are made by several different manufacturers under their own trade names, and have undoubtedly established new standards of excellence in varnishes and enamels of which they are a part. The first two decades of the 20th century thus heralded greater changes in the development and perfection of all classes of oil-resin coatings than had been evolved for many hundreds of years. Nitrocellulose lacquers which we last saw as thick, troublesome solutions with very little coverage when pigmented had, in the meantime, made great strides forwards. The story of the development of pigmented lacquers and the newest type of oilless varnish resins will be told in the next issue.

The author wishes to acknowledge with thanks the helpful criticism offered by: Mr. A. J. Beecher, Essex Varnish Co., and Mr. J. W. Raynolds, Pneumatic Painters of New England.



The Uses of LAMINATED and Why

By W. G. Steiner
Formica Insulation Co.

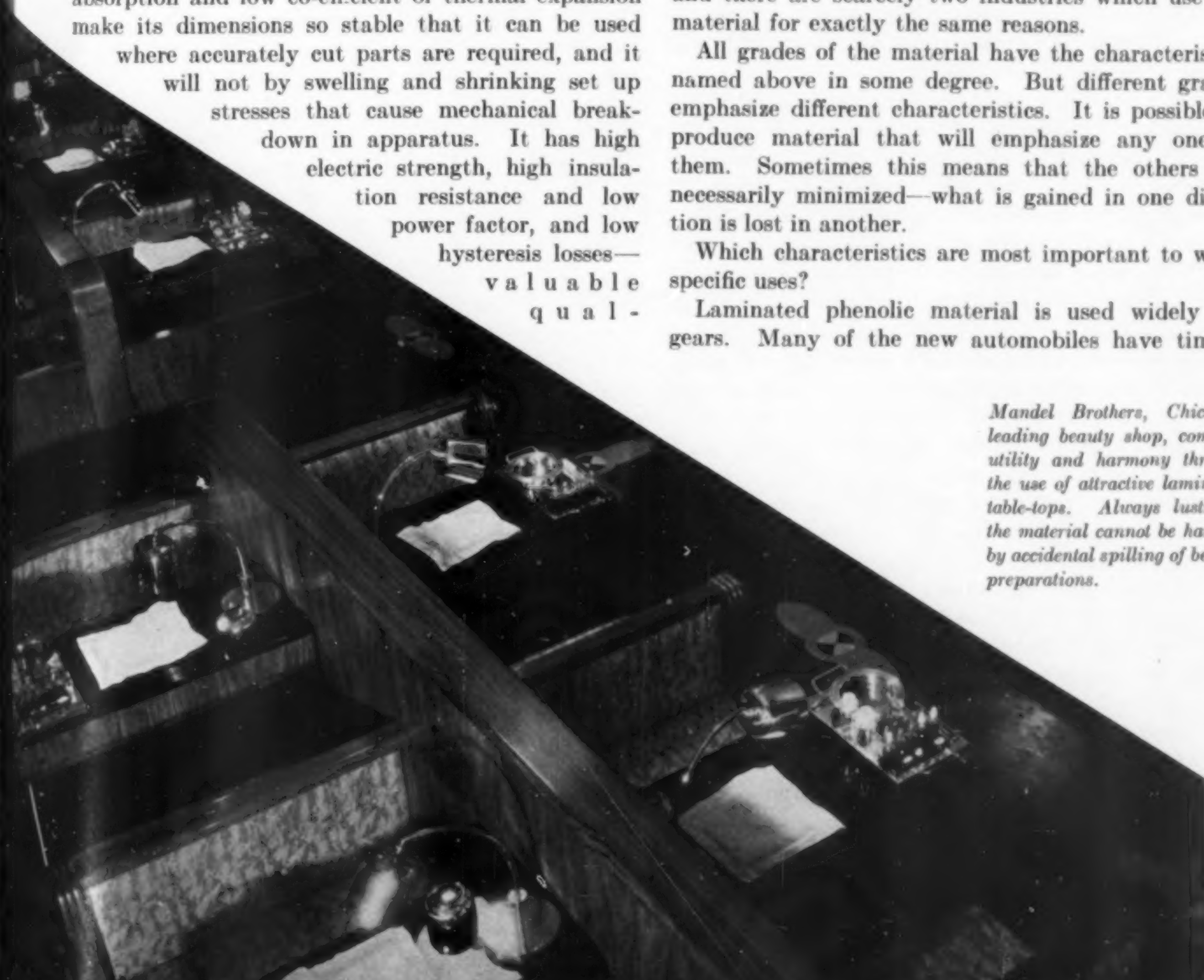
LAMINATED phenolic material absorbs very little moisture. It is mechanically strong and not brittle. It weighs about half as much as aluminum. It is exceptionally inert chemically and will stand the equivalent of about 20 per cent. concentration of sulfuric acid or about 12 per cent. of alkali. It is more elastic than many common metals and used for mechanical purpose will stand much more deformation without breakdown. Low moisture absorption and low co-efficient of thermal expansion make its dimensions so stable that it can be used where accurately cut parts are required, and it will not by swelling and shrinking set up stresses that cause mechanical breakdown in apparatus. It has high electric strength, high insulation resistance and low power factor, and low hysteresis losses—valuable qualities in electrical insulation. It can be made in a wide variety of colors.

This is an impressive list of qualities. They make the material useful in about 35 lines of industry—and there are scarcely two industries which use the material for exactly the same reasons.

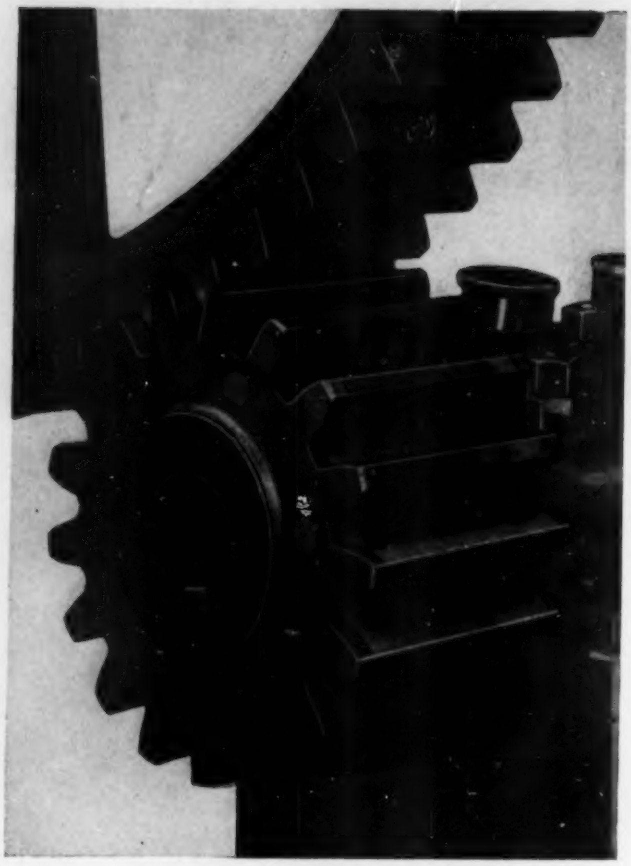
All grades of the material have the characteristics named above in some degree. But different grades emphasize different characteristics. It is possible to produce material that will emphasize any one of them. Sometimes this means that the others are necessarily minimized—what is gained in one direction is lost in another.

Which characteristics are most important to what specific uses?

Laminated phenolic material is used widely for gears. Many of the new automobiles have timing



Mandel Brothers, Chicago's leading beauty shop, combine utility and harmony through the use of attractive laminated table-tops. Always lustrous, the material cannot be harmed by accidental spilling of beauty preparations.



Enlargement of Silent Laminated Gear.

gears of the material, and laminated gears are used on all kinds of heavy and light machinery, from printing presses and paper machines down to coffee grinders. The chief reason for this use is that the material is quiet because it is non-metallic and elastic. Ability to hold its dimensions is also important. Its resistance to moisture absorption and notably complete refusal to absorb oil are important.

Before phenolic laminated gears were available, most gear sets consisted of one gear of steel running against a cast iron gear. In some cases where silence was very important pinions of pressed rawhide were used. Laminated gears took the place of the cast iron gear in the set. The material is not quite so strong as cast iron, although nearly so, and it is therefore necessary to design the gears with a little more ample proportions. However, laminated gears are much more elastic than cast iron and the teeth can be deformed to much greater extent before breaking. Cut and fitted right they usually outwear the metal gears. They produce a quiet running set of gears even when the cutting is much less accurate than with metal. This saves the necessity of rejecting some gears and makes possible rapid production with less loss of labor and material.

Another important field is in electrical devices of all kinds where laminated is used as an insulator to confine the current to the parts designed to carry current. The essential characteristics here are of course high insulation resistance, high di-electric strength and low power factor.

But some other materials which have these same characteristics—some in even higher degree—lack some of the essentials of laminated. They may be good insulators but be brittle, easily broken and almost impossible to work and machine. Laminated combines with its excellent insulating qualities a rugged strength and lack of brittleness. It can be punched, sawed, machined easily in any way that metal may be machined. Grades can be produced with ample electric qualities for all ordinary uses that are especially adapted to rapid production methods without breakage and waste. Low moisture absorption is an essential quality for insulating purposes. Other materials are excellent insulators when dry, but may absorb enough moisture so that the current can find its way through them, traveling along the water content as a conductor. Absorption of water in a fibrous material almost always means swelling. In carefully designed apparatus, where the parts might be tightly held, such swelling might easily twist the whole device out of shape. Laminated will not do that.

Laminated phenolic material is also used widely for its chemical inertness in the plating industry and in rayon and similar chemical plants where solutions have to be handled that are hard to hold with ordinary materials. The cadmium plating process introduced solutions that were more destructive of material used in plating barrels than any used before. Laminated material began its career in this line when it was used first for plating barrel panels. It was soon found that the panels greatly outlasted the outer parts of the barrel—usually made from wood—and then it became common to build the entire barrel with laminated. Special material was then developed with copper conductors imbedded in the material itself. Most well equipped plating departments working on small parts now have equipment of this character.

In the rayon industry solutions, in which the digested cellulose is carried when spun into yarn, contain a great deal of alkali and destroy most metals and most organic material very rapidly. In addition, they spin at very high speeds and must be both light and strong. Recently the leading rayon producers have been installing spinning buckets and spinning bucket covers of laminated.

Where dyes are handled, laminated material is useful for covering tables and lining trucks on which damp textile material is carried about the plant. The fact that laminated is not absorbent and can be readily cleaned by being flushed off makes it easy to clean a truck that has recently carried a load of blue dyed materials so that the color will not contaminate the next load which may be red. The material is very smooth and does not break down in slivers that snag the cloth and produce seconds. This is another important reason for its use on working surfaces in textile mills.

Another important field recently opened up for laminated material is the decorative field. That is,

the material is used to provide the surface of sheets and panels used on furniture and building material. Adaptability to this use is—as in the chemical industries mentioned above—its chemical inertness. The surface is not affected by common solutions such as fruit juices and the mild acids associated with food. It is not stained by liquids. It will stand any cleansing solution unless the solution is strong enough to eat up the mop and pail.

Oxidization and chemical breakdown cause decay and corrosion, and bring about the destruction of most of the works of man. The resistance of laminated material to this action makes it the most permanent of all materials of organic origin.

It retains its surface in the weather. It is hard and will stand a great deal of wear without injury. Areas covered with it are as nearly free from future upkeep, maintenance and refinishing expense as is possible.

On restaurant table and counter tops, where moisture and liquids, acid and alkaline, are encountered, it gives better service than finishes previously available. It has been used on deal plates and counters in banks, and on hotel and hospital bedroom furniture where alcohol and other similar solvents make short work of finishes made by applying ordinary lacquers or varnishes.

Laminated is made ordinarily in three forms: sheets, tubes and rods. Every type of part that can be economically produced by machining is made from these shapes. The material is worked on metal working tools—the same equipment that would be used for working cast iron.

Laminated material is essentially a sheet of fibre—either paper or cloth—soaked in phenolic resins and cured under heat and pressure in a hydraulic press. It requires about 300 degrees of heat Fahrenheit and about 1100 pounds of pressure to the inch to effect the cure. The cycle varies somewhat with the type of resin used, but ordinarily requires about 45 minutes.

The great difference therefore between laminated phenolic material and phenolic moulding powders lies in the length of the fibres in which the phenolic resins are absorbed. The long fibred sheets used in laminated give it greater strength but they also impose certain limitations on the methods of working the material.

It is impossible, for instance, to mold many shapes with it. There are a few regularly in production, among which are timing gears for automobiles with a thick hub and rim but a thin web, trays for use in cafeterias, spinning buckets for use in rayon mills. In molding laminated material it is necessary to cut the fibre sheets in which the phenolic resin has been cured to size with dies similar to those used in the shoe industry for cutting out the parts of shoes. These are then carefully assembled by hand, and must be placed in the mold in a certain order. The material will of course not flow freely in the mold. It must therefore be cut to fit the mold with reasonable accuracy before it goes into it. In general, molded parts of laminated are feasible only where a large number of identical pieces are to be produced, and where the requirements of strength are such that they cannot be met by the short fibred molding compounds made with wood flour and phenolic resins.

During the past twenty years there has been a steady increase in the number of applications of laminated. It has unusually been necessary to sell it at a higher price than the material it displaced.

In the big days before the crash the volume of laminated material made and sold in the United States reached a total of around $16,000,000. More recently the figure is probably in the neighborhood of $6,000,000, but the number of uses for the material has been steadily increasing as the volume went down, and there is reason to believe that when industry revives it will again be made in good volume.

The following table gives certain physical characteristics of laminated phenolic sheet:

The following are average values of tests on Formica made by the A.S.T.M. Test Methods using test specimens at the thicknesses indicated:

	Tensile Strength, Lbs. per Sq. In. A.S.T.M. D-229-28-T			*Flexural Strength Lbs. per Sq. In., A.S.T.M. D-229-28-T Tested Flatwise*			*Rate of Water Absorption A.S.T.M. D-229-28-T*		*Hardness Rockwell "E" Scale*
Grade	Thickness	Lengthwise	Crosswise	Thickness	Lengthwise	Crosswise	Thickness	Rate	⅛"Ball 100 Kg Load
X	⅛"	17,800	13,600	⅛"	25,100	21,000	⅛"	4.50%	E-70
XP	⅛"	15,200	9,600	⅛"	19,500	16,300	⅛"	3.50%	E-45
XX	⅛"	14,500	11,500	⅛"	20,000	17,000	⅛"	1.20%	E-75
XXX	⅛"	12,000	10,000	⅛"	17,000	15,000	⅛"	0.95%	E-82
C	⅛"	11,800	11,400	⅛"	23,000	20,700	⅛"	1.15%	E-70
L	⅛"	12,500	9,700	⅛"	24,200	18,100	⅛"	1.95%	E-75

	Dielectric Strength, A.S.T.M. D-149-27-T Volts per .001", Tested in Oil			*Power Factor and Dielectric Constant A.S.T.M. D-150-27-T*		
Grade	Thickness	Short Time	Step by Step	Thickness	Power Factor	Dielectric Constant
XP	⅛"	685	560	⅛"	.048	5.8
XX	⅛"	720	620	⅛"	.035	5.1
XXX	⅛"	775	670	⅛"	.033	4.5
L	⅛"	225	170	⅛"	.060	6.2

Specific Gravity All Material—1.32—1.38.

A Britisher Looks At

Plastics Progress

By Foster Sproxton

Mr. Sproxton, who has been active in the organization of the new Plastics Group in the Society of Chemical Industry, contributed to their official journal "Chemistry & Industry" the review which is here abstracted for American plastics users.

ALTHOUGH the application of scientific research to the problems of the plastics industry has been considerably intensified in recent years, even now it cannot be said to be abreast of all the technical developments. There is still some sting in the old gibe that the factory man improves the process and the chemist tells him some time afterwards why he has done so.

The truth is that much of the chemistry and physics of the industry is so fundamental that the resources of most manufacturing companies will not permit them to finance the necessary research. Although this is to be deplored, it must not be overlooked that the dependence of industry on academic research for some of its facts is healthy and tends to keep university laboratories in touch with industrial reality.

The plastic industries based on cellulose have perhaps been the most fortunate during recent years in this respect. Cellulose, instead of being the hazy, intangible, elusive conception that it was twenty years ago, is being rapidly delineated with an accuracy and definition approaching that of our knowledge of the sugars. Purely chemical methods have established that the glucose ring is the unit of construction and have also determined the average length of the chain. X-Ray research has shown the crystalloid nature of its structure and has measured the dimensions of the unit cell. Viscosity research has provided independent confirmatory evidence of the length of the chain, and the nature of the reactions, which cause increase of fluidity both of cellulose and its derivatives, has been established.

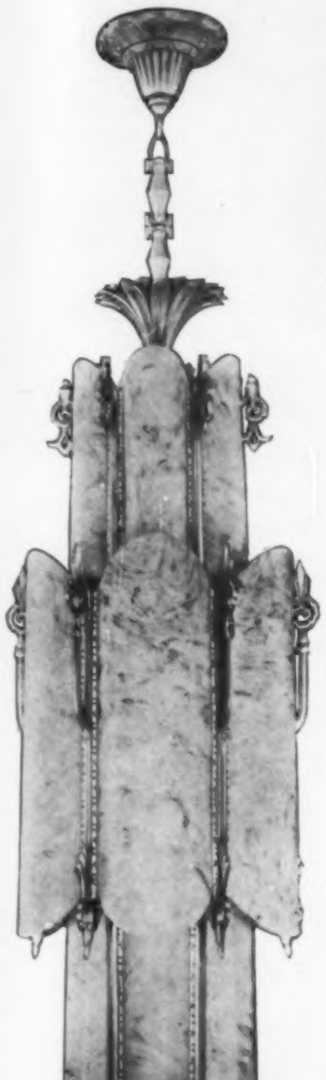
In pyroxylin, one of the oldest plastic materials, camphor is still and is likely to remain by far the most widely used plasticizer. The production of pyroxylin has been cheapened in the processes of nitration, and improvements have been made in the stability, the resistance to light, and the clarity of the product. Although the older forms of artificial ivory and of tortoiseshell still command a large sale, the industry has been stimulated by the competition of other plastics to enlarge its range considerably. Perhaps the most remarkable among recent developments has been the production of artificial mother-of-pearl. A feature of the pyroxylin trade both in Europe and America in recent years has been the provision of a suitable material for fountain pen manufacture.

Cellulose acetate, although it has not developed as a plastic so rapidly as it has in the manufacture of artificial silk, has made considerable progress in recent years. Cheaper methods of production of acetic anhydride and economy in acetic acid consumption have reduced the cost of the base, and an increased range of solvents and plasticizers is available. The methods of manipulation are substantially the same as for pyroxylin, so that new configurations in one material can usually be introduced in the other. There has been a large increase in the use of cellulose acetate for the manufacture of translucent electric lamp shades, for which pyroxylin is unsuitable.

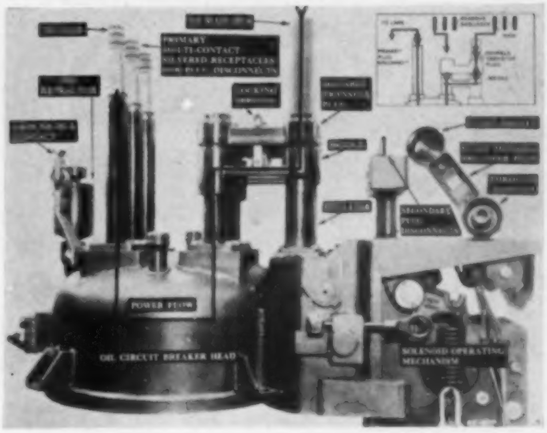
The low softening point of mixtures of cellulose acetate and plasticizers and its stability at 160° C. make it specially suitable for molding powders, and it is well adapted to the process of injection molding in which the powder is made plastic and is then squirted under high pressure through a narrow channel into the required mold. In the United States cellulose acetate plastics have found application in certain types of electrical insulation work where there is a possibility of a high tension arc

Plastics in Pictures

This attractive lighting fixture is made of a metal frame with Catalin sheets, and is produced by the Globe Lighting

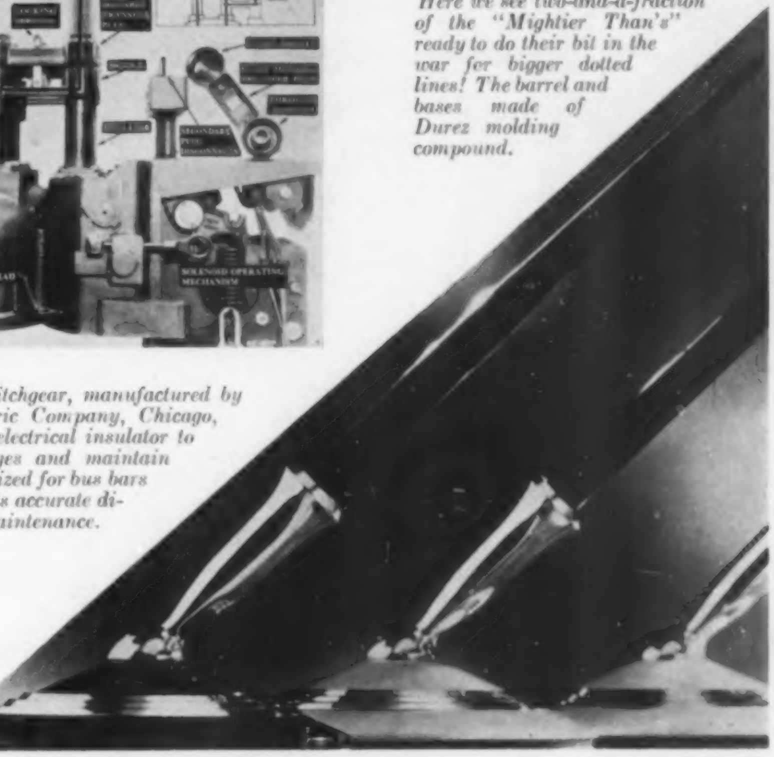


Fixture Mfg. Co., of Brooklyn, N. Y. When illuminated it brings out all the richness and depth of color of the cast material.

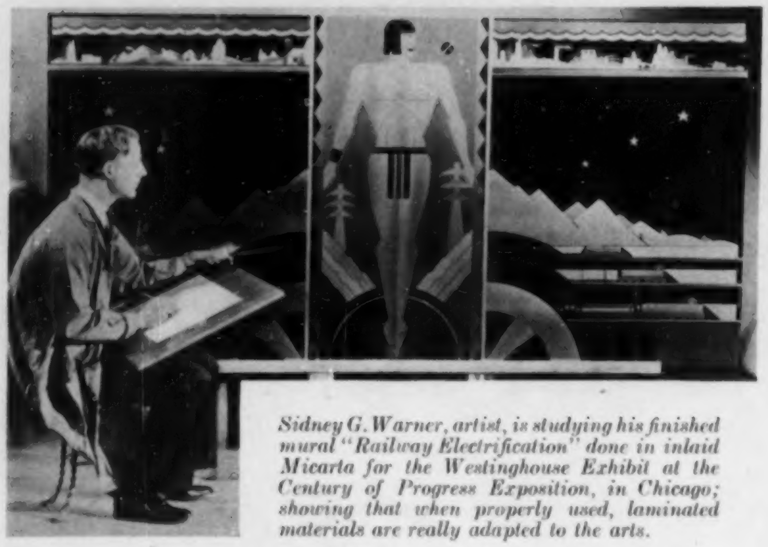


This Metal-Clad Switchgear, manufactured by the Delta-Star Electric Company, Chicago, uses Bakelite as an electrical insulator to reduce corona voltages and maintain safety. It is also utilized for bus bars and bushings since its accurate dimensions facilitate maintenance.

Here we see two-and-a-fraction of the "Mightier Than's" ready to do their bit in the war for bigger dotted lines! The barrel and bases made of Durez molding compound.



The striking texture and color of du Pont's Fabrikoid admirably adapts it to the handbag field. In addition, it is much more easily cleansed than most other materials and, being inexpensive, permits volume distribution.

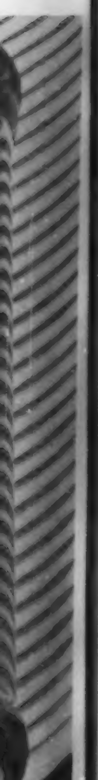


Sidney G. Warner, artist, is studying his finished mural "Railway Electrification" done in inlaid Micarta for the Westinghouse Exhibit at the Century of Progress Exposition, in Chicago; showing that when properly used, laminated materials are really adapted to the arts.

The Vapurse Dry-Inhalant distributed by the Eagle Druggist Supply Co. is packaged in handsome Bakelite molded containers which are a convenient aid in doctoring colds. They come, of course, in a wide range of colors.

An interior scene in Mandel Brothers, leading Chicago beauty shop. This birds-eye view shows how black and colored Formica is given a generous utility use in this field.

A flashlight made entirely of Bakelite molded. It is light in weight, will not corrode, and comfortable to the touch even in cold weather. These searchlights are made in England.



dsome Bake-
e, in a wide

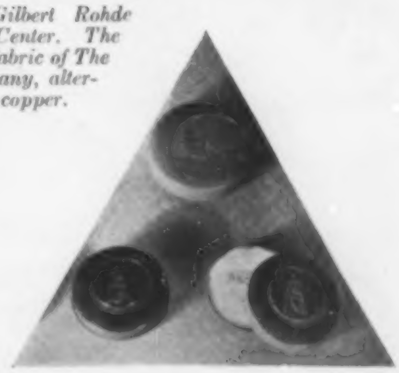
A group of molded Durez jars showing some unusual shapes and designs.

The modern barber need no longer wash his hands with the shaving cream he puts on your face! This container ejects a sufficient quantity of soap into his brush in close to liquid form. Black Durez and white Plaskon are the materials used.

WCAU—Radio Station in Philadelphia has paneled its studio in 1/16th inch Formica sheets with metal trimming. This not only enhances beauty and utility but acts as an additional sound-proofer.

This apartment designed by Gilbert Rohde was recently shown at the Art Center. The walls are finished in a lacquered fabric of The Standard Textile Products Company, alternating with bands of burnished copper.

This is what happens when an artist-fabricator turns to plastics. A group of popular-priced novelties designed by George Graff of Toledo, combining zinc diecastings plated in brass, copper and chromium, with black molded Durez. Beautiful contrasts in values are thus obtained.



The box is Durez, the compacts are Bakelite—both are interesting examples of decorative art applied to small objects to increase their sale.

The Packaging Show

held last month at the Hotel Pennsylvania, New York City, had several exhibits of interest to the plastic field. The display pictured on the left is that of General Plastics Inc., Manufacturers of Durez materials. They exhibited a full line of their customers' products in the packaging field and the identifying cards for each exhibit gave the customer's name, as well as that of the designers responsible for the larger articles.

Aside from the outright exhibitors of plastic materials, the only concern to use plastics in decorating its booth was the Pilliod Cabinet Company of Swanton, Ohio. The tubes at the rear of the booth, on either side, were made of acetate sheeting and formed a colorful and attractive display. This company is one of the largest producers of boxes and cabinets, and is among the largest users of lacquers and varnishes.

The Bakelite Corporation, Bound Brook, N. J., was well represented by this booth which featured customer's finished products and the well-known Bakelite "Sample-Kit." The glass shelves in the background were illuminated from the rear, and the fabric used in the center panel of the display was made of the new Revolite cloth, announced for the first time in the March PLASTIC PRODUCTS. The side tables, and the large table in the center, were covered with Bakelite laminated, heightening the ultra-modern appearance of the Exhibit.

passing along the surface. With cellulose acetate no trail of conducting carbon is left if this occurs.

Benzyl cellulose, which is an ether and not an ester of cellulose, is the latest member of the cellulose plastics family to appear in industry. Its resistance to water and to chemical attack is excellent and it is reversibly thermo-plastic. At present the price stands in the way of rapid development—it is appreciably dearer than cellulose acetate with which it is chiefly in competition—but extended manufacture is expected to lead to reduction.

Of the natural resins the most important in the plastics industry is shellac which still forms the basis of the majority of gramophone records—perhaps the most familiar example of precision molding and one demanding the highest accuracy. At the present price of shellac this type of record is economically in a strong position, but any rise in price would favor the competition of records made from the cellulose esters, particularly cellulose acetate, on which a great deal of research has been done. The acetate records are satisfactory musically, but more expensive weight for weight than shellac records. They can be made thinner, however, and the flexible records so produced have attracted considerable attention. The cost of both shellac and cellulose ester records can be reduced by lamination with cheaper materials.

Synthetic Resins Growing Rapidly

The number of the synthetic resins seems to increase nearly every day, but the principal members are still the formaldehyde-phenol resins, the formaldehyde-urea resins, and the formaldehyde-thiourea resins. As is well known, in all these condensations the reaction mixture passes through intermediate stages of molecular complexity before arriving at the final infusible stage. Many variations have been proposed and used industrially for the production of oil-soluble products which can be incorporated in lacquers, but these are outside the scope of this article. Technically, the variations which can be introduced by the use of homologues of phenol, by alteration of catalyst, by the temperature of the reaction, and the use of diluents, have been fairly completely worked out. Chemically, the earlier stages of the reaction passing through phenol alcohols to derivatives of dioxydiphenylmethane have been followed, but the course of the later stages is still a matter of surmise, although it is probable that the condensation is of similar type.

The bulk of the phenol-formaldehyde resin produced to-day is sold in the form of molding powders usually containing wood flour as a filling. The molding possibilities of these products have not by any means been completely explored yet, and the increase in size and complexity of molded articles is a feature. Interesting examples of laminated panelling have also been exhibited. Paper coated with synthetic resin, which can be rolled under pressure and heat so as to form a solid block with the interstices of the fibres completely filled with the non-conducting infusible resin, is used extensively for high voltage insulation.

The product of polymerization of urea and formaldehyde is a colorless resin of great transparency. It can be colored either with pigments or soluble colors, but probably shows to the best advantage when transparent. The first stage in the condensation has long been known to be the methylol ureas and the later course of the reaction is still a subject of research, a recent suggestion being that the unit is an eight-membered ring formed from two molecules of urea condensed with two molecules of formaldehyde.

Plastics From Casein

The analogous thiourea-formaldehyde resins have become a specialty of molded substitutes for china. A large range of colors is available, and exhibits of these materials arranged so as to satisfy the growing taste for color have attracted attention wherever they have been shown. The patent literature of this subject has become very complicated, and whereas the earlier patents dealt chiefly with the influences of alkalinity and acidity at various stages of condensation, latterly inventors have been chiefly concerned with the blending together of phenol, urea, thiourea, and other resins. The value of most of these suggestions will only be shown in course of time.

The production of a plastic material from casein has engaged the attention of chemists for many years. Early attempts were hampered considerably by too close an adherence to pyroxylin technique, which is in many ways unsuitable. Since the war the industry has become firmly established in this country, and although a great deal of research has been directed towards obtaining uniformity in manufacturing conditions, very little has been published on the subject. The demands of the industry have improved the quality and the uniformity of the supplies of rennet casein. To produce the plastic, casein is moistened with water, thoroughly mixed, plasticized by heat and pressure, and hardened with formaldehyde, and the successful conduct of the manufacture depends on the careful measurement of the changes of weight, volume, and composition which take place during these operations. The chief outlet of the product is in the button trade, and the industry has evolved a technique of its own for the production of many striking configurations.

Hard rubber molding may be briefly mentioned insofar as it comes into competition with other materials mentioned in this report. Incompletely vulcanized hard rubber is ground to a fine dust which is molded under pressure at a temperature which completes the vulcanization giving a hard rubber molded article. Inserted metal parts may be molded in position. Although hard rubber owing to its color is handicapped in competition with many other

molding materials, its high insulating resistance and its chemical inertness still give it an important position in the industry.

A brief reference may be made to the supplies of raw materials. Formaldehyde is essential to all the principal synthetic resins and to the casein plastic industry. As long as supplies of methyl alcohol depended on wood distillation the position of formaldehyde was precarious, but with the synthetic production of methyl alcohol on a large scale the supply was assured. Phenol and its homologues depend chiefly on coal distillation, and at the present rate of expansion of the synthetic resin industry there may be some anxiety about the future. Urea is now a cheap synthetic product and available in any quantity in which it is likely to be required. Supplies of cellulose are ample, and if it may be doubted whether wood cellulose is being produced by nature in accessible areas as quickly as it is being consumed, cotton is, at any rate, an annual crop and not confined to any single zone of the globe. There are two main sources of camphor supply, one the natural product from Formosa and the other the so-called synthetic product which is made from oil of turpentine in several countries including Great Britain. The supply of rennet casein is the resultant of several economic forces which are not easy to estimate. It requires an established dairy farming industry with a surplus of milk production. Acetic acid (and also acetic anhydride) no longer depends on the wood distillation industry or the oxidation of alcohol by micro-organisms, and there seems to be no prospect of a shortage of rubber, except possibly a temporary one if the present uneconomic price curtails production.

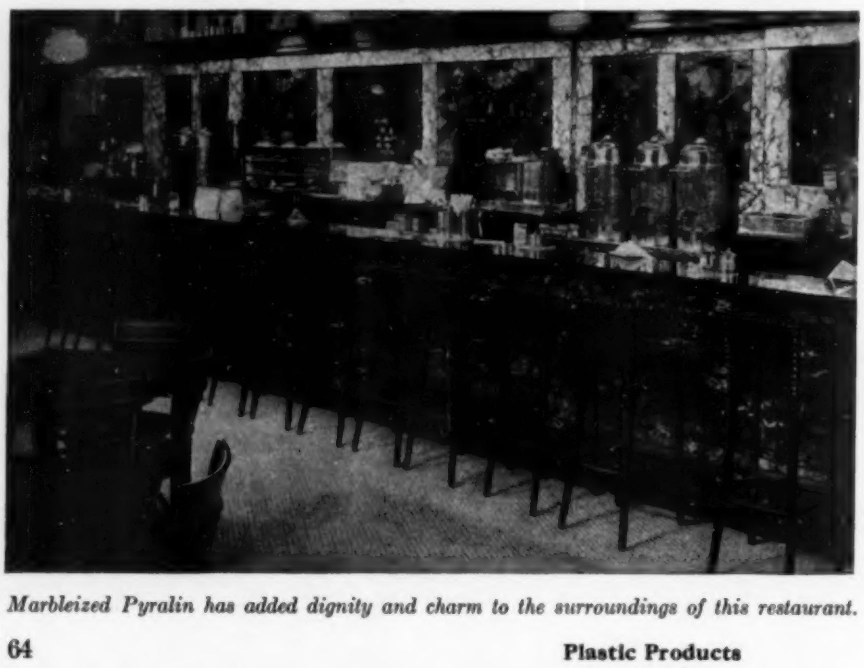
There have been many interesting publications on the chemical, mechanical, and electrical testing of molding materials, and several pleas for standardization of these tests. Standardization will undoubtedly come to a certain extent, but it must not be forgotten that although in certain spheres plastic materials compete with each other, many of them have applications in which competition is much more limited, due to special properties which they possess. The properties desired in a plastic material differ so much that specific tests devised for individual materials are almost certain to be a permanent feature of the industry.

MARBLEIZED PYRALIN

BY A patented process involving the use of color filters, the exact likeness of a fine slab of marble is reproduced on a photographic film which is then transferred to a sheet of transparent du Pont Pyralin, so that the detailed depths and true colorings of the slab are fully preserved. The back of this sheet is then sprayed to obtain an opaque or translucent color as desired.

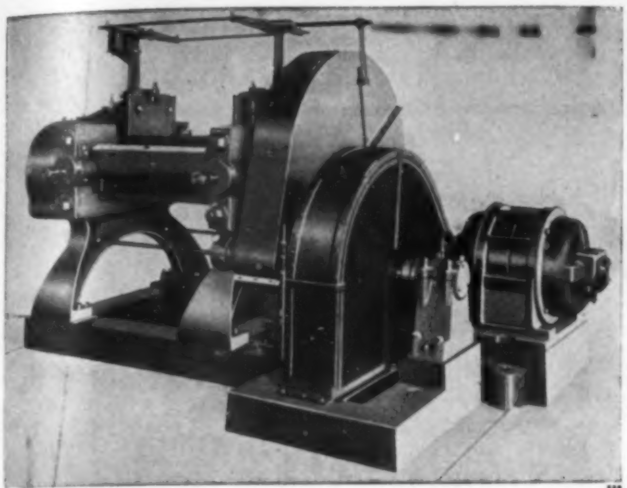
This sheet with its marble-like impression, is securely laminated between the two pieces of glass by means of heat and pressure. It is the Pyralin, cellulose plastic, that makes this composite product both durable and beautiful, and the result is a finished material that looks exactly like, but is actually better than, the real quarried product, because the decoration and colorings are under the surface instead of on it. The material is ideal for both exterior and interior treatment of store and building fronts, soda bars, shower bath rooms, wall panelings; in fact, any place where decorative marble has been used heretofore.


Another effective use is in the decoration of wall areas in public buildings.


Marbleized Pyralin has added dignity and charm to the surroundings of this restaurant.

Marbleized Pyralin has unlimited possibilities in the decorative field. Already it has been used for store fronts in place of quarried marble.

It can be perfectly "booked" at little or no additional effort or expense. That term, in the parlance of the marble industry, means matching the grains of one slab of material with those of another, so that when the two pieces are placed side by side on a wall, floor or some other place, the grainings will match perfectly. This is a long and very expensive operation where quarried marble is used.



Plastics in the News

Premium Exposition at Chicago—Synthetic Plastics Sued—du Pont Announces Synthetic Camphor Production—Taylor Plant Ready—Metropolitan Molders' Representatives Meet—Commercial Solvents Wins.

Third National Premium Exposition and Convention will open at the Stevens Monday, May 15, and will continue through Friday. The five day show will give ample time not only to see everything, but will afford buyers and sellers the opportunity to get-together and close business.

PLASTIC PRODUCTS will be at booth 24. Visitors are cordially welcomed to stop in to chat or to rest. At the same time they will be able to view a very complete exhibit of extraordinary premiums made up wholly or in part from a wide range of plastic materials. This exhibit arranged by PLASTIC PRODUCTS is being held in conjunction with a special Plastic Premium Number of PLASTIC PRODUCTS (May issue) which will be distributed at the Exposition.

The premium business offers almost virgin territory to the plastic field. Said the April *Durez Molder* (General Plastics) speaking of the Premium Exposition: "The demand for premiums seems to be limited only to the ingenuity of someone to devise new ones suitable to a manufacturer's needs . . . Public acceptance or desire for premiums is, of course, more pronounced when the public feels poor." Said *Novelty News:* Coming at a time when the whole nation is girding itself for a mighty revival of business, it takes on an unusual significance."

Reports from all the large retail centers in the past month show a very decided upturn in business. Because of relative newness, great adaptability, attractiveness, serviceability and reasonableness in cost, plastic materials have a very definite place in the premium field, and the coming exposition offers manufacturers the ideal place to display their wares to the greatest advantage.*

Synthetic Plastics vs. Unyte

Synthetic Plastics (Cyanamid's "Beetle") is defendent in suit brought jointly by Ellis-Foster and Unyte in Federal Court at Wilmington. Complaint served March 27 alleges infringement of a number of patents in the urea-formaldehyde resin field. Patents in question are said to cover urea-formaldehyde type of resin invented by Pollak and Ripper of Vienna and assigned to Pollpas, Ltd., Great Britain. Unyte is headed by former Kuttroff, Pickardt partner, William P. Pickhardt. Company was formed in February, 1930, acquiring at that time patent rights and processes to urea resins from the I. G., Ellis-Foster, and Carleton Ellis individually.

Almost simultaneously with the filing of this suit came an announcement from Synthetic Plastics† that it had granted license under its patent rights to Bakelite for the field of urea resin molding compositions.

Said the announcement: "Included in the patents of Synthetic Plastics are those covering pioneer inventions of Drs. Fritz Pollak and Kurt Ripper, of Vienna, acquired from Pollopas Company of England, and those covering technical developments of the British Cyanides of England, as well as the subsequent developments of the laboratories of Cyanamid."

*Guest membership cards entitling holder to reduced fare rates: H. W. Dunk, 2 Lafayette st., N. Y. City, A. B. Coffman, 35 E. Wacker Drive, Chicago.

†Synthetic Plastics April 1 filed suit in Toledo Federal Court against Toledo Synthetic Products ("Plaskon") alleging infringement of basic patents.

British News

H. R. H. Prince George was guest of honor of the British Plastic Moulding Trade Association at annual trade luncheon March 23. Besides Prince George guests included Sir Harry McGowan, I. C. I. head, and Prof. Morgan, director, Teddington Chemical Laboratory.

The Royal Academy of Art, London, Europe's premier fine art institution, will hold in collaboration with the Royal Society of Arts, an exhibition of art and industry during the months of January and February, 1935. Exhibit is to stress the importance of artistic design to modern British manufactures, and will include plastics of all types.

Coatings

New du Pont Materials

Du Pont's finishing division has developed series of paint materials for traffic markings on highways and streets. New products are designed to stand up under severe weather and other conditions which most markings are subject to. Four of the new products are quick drying similar to lacquer.

A new fast-drying pyroxylin enamel for use as a 1-coat finish on bare metal has been developed by du Pont. It is known as Pyralux and is available in 36 standard colors.

S. R. Grovenstein, Archer-Daniels-Midland, Minneapolis, and J. O. Kaser, Glidden, were guest speakers at March meeting of Cleveland Production club. Mr. Grovenstein talked on "Linseed Oil in Lacquer" and Mr. Kaser on "Cost Accounting."

Possibilities

Ursolic acid is found in fruit skins and leaves of such plants as the wild black

Paint, Varnish and Lacquer Sales

Sales of paint, varnish and lacquer products in January totaled $12,782,859 in value, according to a preliminary report by the Bureau of Census from data received from 588 establishments. This compared with sales of $10,127,780 in December and $15,894,506 in January, 1932. A record of sales in January compared with revised figures on October and November sales and preliminary figures for last December, follows:

		—Classified sales reported by 344 establishments—				
		—Industrial sales—				
1933	*Total sales reported by 588 establishments*	*Total*	*Paint and varnish*	*Lacquer*	*Trade sales of paint, varnish lacquer*	*Unclassified sales reported by 244 establishments*
January†	$12,782,859	$5,218,874	$4,073,343	$1,145,531	$4,073,343	$3,490,642
1932						
January	15,894,506	Comparable statistics not available.				
February	16,270,822					
March	19,089,005					
April	22,612,193					
May	24,981,441					
June	19,637,358	4,685,399	3,617,719	1,067,680	8,734,330	6,217,629
July	14,430,122	3,793,245	2,900,707	892,538	6,058,813	4,578,064
August	16,032,441	3,851,028	3,057,096	793,932	6,918,659	5,262,754
September	16,805,712	3,980,564	3,113,303	867,261	7,216,748	5,608,400
October*	15,592,377	3,996,500	3,036,323	960,177	6,610,011	4,985,866
November*	13,260,328	3,599,310	2,639,362	959,957	5,196,766	4,464,243
December†	10,127,780	3,222,770	2,186,706	1,036,064	3,506,715	3,398,295
Totals, year	$204,734,085	....	....	....	....	....
Totals, 1931,	$278,442,170.					
Totals, 1930,	$348,400,057.					

*Revised. †Preliminary.

cherry and certain types of apples, and oleanic acid, a similar compound, in grape skins and olive leaves. It has recently been suggested that if an industrial use of these substances could be found they could be made available in almost unlimited quantities as by-products of the canning industry.

These acids have been tried in connection with cellulose lacquers and results indicate that addition of very small amounts in the neighborhood of 0.05 to 0.07 per cent. to a clear nitrocellulose lacquer retard drying by nearly an hour, while at the same time the gloss is stated to be improved. Effect on drying time is greatest where solvents used are poor. These experiments suggest that ursolic and oleanic acids might be used with advantage in brushing lacquers. Tensile strength of films and resistance to weathering tests and durability are not adversely affected by the addition.

Hercules is mailing new booklet "Prevention of Gas in Pigmented Nitrocellulose Lacquers". Copies are available from Wilmington main office.

Esterpol—New Glyco Resin

Glyco Products, Bush Terminal Bldg., No. 5 has just started commercial production of—Esterpol—a new light straw-colored transparent resin, which is of a rubbery nature, being flexible and resilient. It is a polymerized non-tacky ester free from sulfur or metallic hardeners.

Lacquers formulated with Esterpol enjoy its advantageous properties as mentioned above and in addition permits the use of a greater percentage of total solids per unit of solution.

Cellulose

Laminated glass patent 1,900,536, John C. Zola, Tarentum, Pa., assignor to Duplate Corp., filed March 3, 1931, granted in February. Patent is described as follows:

A laminated plate comprising a pair of glass sheets, an interposed sheet of cellulose ester plastic and a joining layer of material between each of the glass sheets and the sheet of plastic comprising the condensation product produced by heating a polyhydric alcohol with a dibasic aliphatic acid containing six or more carbon atoms in a normal straight chain.

Handbags of du Pont Pyralin in 10 different styles are being offered for current season by Zyloware Corp. Best & Co. and Lord & Taylor are carrying the bags. This is the first line of handbags to be made of this material, although it has been used in the past for making frames and ornaments for bags.

Production Statistics

Following tables present monthly statistics relating to pyroxylin-coated textiles based on data reported to the Bureau of the Census by 18 (a) identical establishments comprising most of the industry. The data given include products manufactured by spreading nitrocellulose or pyroxylin preparations, either by themselves or in combination with other materials, upon grey goods, such as sheetings, drills, ducks, sateens, moleskins, etc. Monthly capacity of 18 establishments amounting to 11,950,064 yards, in February, is based on a maximum quantity of 1.27 to 1.30 sateen, coated to a finished weight of 17½ ounces per linear yard, in a 24-hour working day, 26 days to a month.

	1931 February	*1932 February*
LIGHT GOODS:		
Shipments—		
Linear yards..........	1,474,551	1,206,127
Value................	$451,010	$291,570
Unfilled orders (b)—		
Linear yards..........	1,038,301	910,124
HEAVY GOODS:		
Shipments—		
Linear yards..........	1,249,147	1,032,640
Value................	$804,390	$501,869
Unfilled orders (b)—		
Linear yards..........	2,019,440	1,417,287
PYROXYLIN SPREAD (c):		
Pounds..............	3,043,885	2,407,729
	1933 January	*1933 February*
LIGHT GOODS:		
Shipments—		
Linear yards..........	1,066,206	1,243,184
Value................	$266,729	$255,337
Unfilled orders (b)—		
Linear yards..........	820,711	870,415
HEAVY GOODS:		
Shipments—		
Linear yards..........	889,978	884,987
Value................	$424,997	$395,657
Unfilled orders (b)—		
Linear yards..........	1,354,439	1,317,494
PYROXYLIN SPREAD (c):		
Pounds..............	2,121,152	2,374,290

(a) Of the 18 establishments reporting for February, 1933, 1 establishment did not report prior to January, 1933.

(b) Orders on hand at the close of the current month (reported in yards only) exclusive of contracts with shipping dates unspecified.

(c) Based on 1 lb. of gum cotton to 7 lbs. of solvent, making an 8-lb. jelly.

Bureau of the Census presents in following table monthly statistics on production and shipments of pyroxylin sheets, rods, and tubes, based on data furnished by nine identical establishments. According to returns for Biennial Census of Manufactures, 1929, these establishments manufacture in excess of 95 per cent. of the total amount produced for sale by all plants in U. S.

Production and Shipments in Pounds

Month	*Sheets*		*Rods*		*Tubes*	
1933	*Prod.*	*Ship.*	*Prod.*	*Ship.*	*Prod.*	*Ship.*
Jan..........	635,078	752,832	75,707	119,098	14,070	29,369
Feb..........	597,121	687,672	80,828	101,903	23,002	25,741

I. C. I. Insulating Product

A new flexible electrical insulating material has been introduced by the Imperial Chemical Industries (I. C. I.). It is reported that the cellulose ethers, which are insoluble and do not swell in water, are used with plasticizers consisting of aromatic poly-ethers of polyhydric alcohol, with or without fillers. Finished material is said to be non-inflammable, chemically stable, impermeable to moisture and to have high electrical resistivity. It is of special advantage in aerial or subterranean electric cables.

Celluloid Corp. (Controlled by Celanese Corp. of America) reports for 1932, as certified by independent auditors, net loss of $399,180 after depreciation, inventory adjustments, etc., comparing with net loss of $588,857 in 1931.

Oliver Benz, vice-president, in charge of sales for Du Pont Cellophane, spoke recently at the luncheon of the Sales Executive Club of New York, at the Hotel Roosevelt.

Synthetic Camphor

At recent A. C. S. Meeting N. Y. U. Professor, John J. Ritter, announced a new method for the synthetic production of camphor from turpentine. "New method," he predicted, "will doubtlessly aid materially in establishing camphor industry in U. S., where it logically belongs." Process is reported as based on new principle in camphor synthesis, is more direct than existing methods, produces high grade product at minimized cost, and passes through intermediate stages never before employed. This is the second synthetic camphor announcement within 60 days—Lammot du Pont in his annual stockholders' report stated that a new process for synthetic production of camphor had been discovered. Du Pont Company is a very large consumer of camphor. April issue of the *Du Pont Magazine* features announcement of production of commercial quantities at Deepwater, N. J. plant. A review of camphor appeared in CHEMICAL MARKETS, Sept. 1932 p. 235.

PYROXYLIN PLASTICS PRODUCTION—QUANTITY AND VALUE—1931, 1929, 1927, 1925, 1923, 1921
(Source: Reports of the Bureau of Census, Department of Commerce)

	1931	*1929*	*1927*	*1925*	*1923*	*1921*
Total Value..............	$17,659,104	$28,585,368	$21,211,023	$24,705,056	$28,981,587	$16,026,007
Total Value..............	$17,659,104	$28,585,368	$21,211,023	$24,705,056	$28,981,587	$16,026,007
No. of Establishments....	12	10	8	8	8	8
Total production—lbs.....	14,820,767	25,283,235	19,503,710	17,859,469	27,651,910	21,678,285
Made and consumed in same establishments—Pounds..............	3,001,330	4,856,625	3,205,687	4,156,313	3,671,794	
For sale in same establishments						
Pounds..............	11,819,437	20,426,610	16,298,023	13,703,156	23,980,116	
Value................	$11,113,618	$18,063,154	$14,409,668	$13,720,802	$17,682,049	$13,966,108
Finished articles of pyroxylin made in the producing establishments—Value..	$ 6,545,486	$10,522,214	$ 6,801,355	$10,984,254	$11,299,538	$ 2,069,899

Laminated

Taylor Plant Ready

Taylor & Co., Norristown, Pa., manufacturers of vulcanized fibre and phenol fibre, will complete construction of and commence operations in its new and modern plant during the early part of May. Company will produce a complete line of vulcanized fibre, fish paper and laminated phenolic products including noiseless gears.

Plant is located on the Schuylkill River about 20 miles from Philadelphia, and its erection was started in August, 1932. It is new from the ground up, and is equipped throughout with machinery of special design. Company has been able to incorporate improvements in manufacturing processes tending toward improved quality and decreased costs which are only possible in a new plant and which could not be installed in an older plant except at excessive cost.

J. M. Taylor, president, L. T. McCloskey, sales manager and C. N. Jacobs, plant manager were formerly with Diamond State Fibre.

Continental-Diamond Loss

Continental-Diamond Fibre and subsidiaries report for 1932, as certified by independent auditors, loss of $664,075 after deducting selling, administrative and general expenses, cost of sales, provision for depreciation and write-down of inventories, etc., comparing with loss of $217,313 in 1931. Sales for 1932, less returns, allowances, etc. totaled $2,729,702, against $4,362,534 for preceding year.

Molded

Metropolitan Molders' Representatives Group lunched March 24 at the Machinery Club. C. J. Groos, Boonton Molding, presided over the meeting and introduced T. W. Dunican, Lehn & Fink, who spoke on some of the difficulties experienced by his company in introducing new packages made up wholly or in part from molded materials. Speaker particularly stressed the advisability of greater cooperation between the molder and the glass or bottle manufacturer. A discussion, based on the objections raised by Mr. Dunican, followed. Those attending included: Nickolas Klein, Louis Gray and A. J. Raymond, all of American Record; H. L. Amdury, Kuhn & Jacobs Machine & Tool; E. A. Muller, Allen & Hill; E. W. Falk, General Electric; V. F. Harkness and C. J. Groos, Boonton Molding; H. C. Seaman, Armstrong Cork; L. K. Detwiler and F. C. Ryder, Shaw Insulator; C. W. Hancock, Techart Corp.; E. Vaill, D. Buchanan, C. Blount, and A. Zimmerman, all of Bakelite.

Convicted—Trade Secrets

John E. Ferguson, managing director, James Ferguson (British); Sidney Welch, director of the same company and Alfred J. Buck, chemist in employ of Bakelite, Ltd., were convicted recently and fined, the first two for making gifts to an employee of another company in payment for trade secrets and the last for accepting a bribe. All pleaded guilty to charge that trade secrets of Bakelite, Ltd., had been unlawfully acquired by James Ferguson, Ltd.

Resin From Lignite

"Kolinit" is name given to new synthetic resin made in Germany from lignite, lignin, and cresol. Process consists in treating mixture of lignite and lignin with 12 per cent. of cresol at a high temperature, removing excess of cresol, washing mass with benzine, grinding it, drying, and kneading. Resin is said to have high insulating power and shock resistance. It is tough, but may be cut and machined.

Auburn Button, Auburn, N. Y., has taken over active business of Allen & Hill—molds and customers' molds. Some equipment has been purchased, but no real estate or buildings were acquired by Auburn in the negotiations.

Design of cosmetic jar (General Plastics), appearing in last month's Plastics In Pictures Section, was erroneously credited to Industrial Design, Inc. Model was the work of Frances Cushing Hall of N. Y. City.

Williams Haynes, publisher of PLASTIC PRODUCTS AND CHEMICAL MARKETS, spoke at the recent Philadelphia Section meeting of the A. I. C. on "Chemicalization of Industry"—a "Threat and a Promise." He also spoke before the Economic Associates, N.Y. group of Wall Street economists. A large part of both addresses was devoted to plastic industry.

T. F. Butterfield, his brother C. E., and E. M. Robb have left Watertown Mfg. to start molding firm of T. F. Butterfield, Inc., in Naugatuck, Conn.

Solvents

Commercial Solvents Wins

Supreme Court, March 6, refused to review conviction of Union Solvents on infringement charges (patent for acetone and butyl alcohol production), thus establishing validity of patent issued to Charles Weizmann Sept. 9, 1919. Patent in original suit in Delaware Federal District Court was defended by Guaranty Trust, Butacet Corp., and Commercial Solvents. Union defended use of process on the ground that patent was invalid because it did not describe any patentable idea, but only the natural life process of the bacteria, and was merely a statement of results of permitting bacteria to function normally. Union appealed case, after losing in lower Court, to U. S. Circuit Court of Appeals, but again lost decision District Court, Dec. 10, confirmed validity of patent, and reaffirmed lower court order issuing injunction and directing Union to pay damages and profits to patent owning companies. Contest has been one of the most bitterly fought in the annals of chemical patent litigation.*

Sharples In Production

Sharples Solvents has completed transference of manufacturing operations from Belle, W. Va., to Wyandotte, Mich. Operations were started at the new location March 10. Company, which specializes in amyl solvents made from pentane, changed its plant location in order to be more advantageously located with respect to consuming markets.

I. G. new solvent, "Buloxfl," is said to offer important new possibilities for manufacture of cellulose lacquers, and possibly may lead to a production of brushing lacquers. Chemically-speaking it is "methylbutlengly-colacetate."

Compared with other solvents it comes nearest to butyl acetate, but differs from the latter by its slower rate of evaporation and virtual absence of odor. Its evaporation time comes close to that of ethyl ester of lactic acid.

Machinery

Farrel-Birmingham Co., Ansonia, is marketing midget size Banbury Mixer of from 90-150 grams capacity, for experimental work on phenol condensation products, rubber, asphaltic materials and the like. Rolls for sheeting the stock are mounted on the rotor shafts, which are the exact duplicates of those used in large commercial machines.

The Abbe Engineering, 50 Church st., N. Y. City, is showing a new Abbe-Lenard Mixer.

Foxboro Company, Foxboro, Mass., has a recent booklet of 44 pages on temperature control, thermometers etc.

Cavalite, new light-weight, waterproof rainwear material, developed by Fabrikoid division of du Pont. New material consists of a special rubber compound applied to a pure silk fabric in such a way that the finished product is all one unit. It is an opaque fabric and has the appearance of leather with a silken sheen. Women's raincoats made of the material weigh less than a pound.

*Commercial Solvents has now asked that Union Solvents be adjudged guilty of contempt and made to pay penalty.

Plastic Patents

Abrasives

Resinoid bonded abrasive with resinoid powder and neutral liquor in plasticizer. No. 1,893,117. Webster and Sandford to Norton Co.

Composition and method for abrasives with liquid condensation product of phenol and formaldehyde, abrasive granules and solidified carbon dioxide. No. 1,901,324. E. E. Novotny to Joseph S. Stokes.

Composition and method for abrasives with surface of synthetic resinous material. No. 1,901,325. E. E. Novotny to Joseph S. Stokes.

Cellulose

Plasticized cellulose ester and hydrogenated ester. No. 1,892,784. A. O. Jaeger to Selden Co.

Cellulose derivative with diphenyl plasticizer. No. 1,893,283. Hitch and Dahlen to du Pont.

Cellulose derivative with cyclohexyl phenol plasticizer. No. 1,893,284. Hitch and Dahlen to du Pont.

Purification of nitrocellulose and subsequent gelatinizing. No. 1,893,677. Frederick Olsen.

Cellulose ester and triamyl phosphate to resemble celluloid. No. 1,894,781. Muench and Nicolai to I. G.

Indurated product of physically and chemically modified cellulose. (Laminated). No. 1,894,907. Hollingworth and Tarr to Continental Diamond Fibre.

Improved plastic nitrocellulose explosive. No. 1,895,144. Botts and Champney to Hercules Powder.

Hydrolysis of cellulose esters with neutral salts, in mfre. of cell. acetate. No. 1,895,351. Staud and Fuess to Eastman Kodak.

Process for new cellulose derivatives from potassium and alcohol treatment. No. 1,895,544. Haller and Heckendorn to F. S. C. I. Basel.

(Textile-rayon) Saponification of cellulose esters. No. 1,895,-920. Camille Dreyfus to Celanese Corp.

Process for cellulose acid composition. No. 1,896,145. Staud and Weber to Eastman Kodak.

Permanent finish on cellulose material by use of cupric ammonium and caustic alkali. (Rayon). No. 1,896,620. Heberlein and Bodmer to Heberlein Patent Corp., N. Y.

Explosive from converted hydrated cellulose. No. 1,896,642. A. S. O'Neill to Western Cartridge.

Cellulose ester with benzoic rosin-phthalic glyceride resin. No. 1,897,015. H. M. Weber to Ellis-Foster Co.

Dental plate base of cellulose nitrate and dibutyl phthalate. No. 1,897,286. J. F. Walsh to Celluloid Corp.

Recovery of acetic acid in solution from the manufacture of cellulose derivatives. No. 1,898,213. Edmond Prince to du Pont.

Molded thermoplastic imitation pearl. No. 1,899,053. A. E. Peterson to Celluloid Corp.

Process for manufacture of cellulose acetate in porous opaque form. No. 1,899,061. Silberaad and Bleasdale, England.

Decorated thermoplastics and process of manufacture. No. 1,899,068. Walsh and Anderson to Celluloid Corp.

Cellulosic matter with paraldehyde as plasticizer. No. 1,899,-078. S. J. Carroll to Eastman Kodak.

Cellulose acetate with oximes. No. 1,899,213. H. B. Smith to Eastman Kodak.

Cellulose organic ester with phenylethyl benzoate. No. 1,899,214. H. B. Smith to Eastman Kodak.

Organic ester with cellulose and brominated diphenyl ether. No. 1,899,215. H. B. Smith to Eastman Kodak.

Purified alpha cellulose from musa hemp fibre. No. 1,899,223. E. C. Worden to Hanson & Orth, N. Y.

Patents issued Jan. 3, 1933 to March 14, 1933.

Process for production of cellulose formates. No. 1,900,599. Egon Elod, Germany.

Double alpha ketonic acid cellulose esters. No. 1,900,871. Staud and Weber to Eastman Kodak.

Recovering from cellulose derivative scrap. No. 1,900,872. Taylor and Smith to Eastman Kodak.

Composition of nitrocellulose and phenyl stearate. No. 1,901,129. Smith and Carroll to Eastman Kodak.

Composition of cellulose acetate and diethyl adipate. No. 1,901,130. H. B. Smith to Eastman Kodak.

Method of dehydrating nitrocellulose by amyl alcohol, removed mechanically. No. 1,901,561. A. Langmeier to Hercules Powder.

Coatings

Resin coating composition of phenol-aldehyde, with drying oil. No. 1,896,842. C. S. Ferhuson to G. E.

Plastic coating or paint, from cereal flour and prophyllite. No. 1,897,016. W. H. Alton to R. T. Vanderbilt.

Composition of equalized pyroxylin, linseed oil, solvent and gluten. No. 1,898,540. J. R. Hutchman to L. E. Carpenter & Co., Newark.

Lacquer Base: leather, urea, glycol and phenol. No. 1,899,054. W. C. Pearson to Leagum Corp., N. Y.

Composition of acetate lacquer with chlorinated rosin. No. 1,899,186. Eberlin and Blanchard to Eastman Kodak.

Process for coating articles with liquid pyroxylin. No. 1,899,-387. W. C. Hampton to Crawford, McGregor & Canby.

Decalcomania process for cellulose and lacquer. No. 1,900,048. F. A. Edgehill to Rayner Decal Co., Chicago.

Manufacture of caoutchouc lacquer with trinitro-phenol. No. 1,900,663. H. Plauson, Darmstadt.

Cellulose nitrate lacquer. No. 1,900,700. H. Finkelstein to I.G.

Finish remover of butyl alcohol or tertiary alcohol. No. 1,901,728. T. F. Bradley to Chadeloid Chemical Co.

Laminated

Compacting process for intermingling and matting fibrous pulp. No. 1,897,479. E. Hopkinson to Naugatuck Chemical Co.

Alkyd resin in laminated glass. No. 1,899,588. H. C. Rohlfs to G. E.

Laminated material of shellac and alkali resin. No. 1,899,591. H. D. Segar to G. E.

Composite safety-glass; gelatine and acetic acid. No. 1,899,-621. H. H. Lamberty, London.

Ten to twenty per cent. synthetic resin in sawdust fibreboard. No. 1,899,786. J. V. Nevin to Pacific Lumber Co.

Laminated glass with cellulose ester plastic. No. 1,900,536. J. C. Zola to Duplate Corp.

Insulating body: fiberized wood, felted and pressed. No. 1,900,698. Geo. H. Ellis to Insulite Co. (Minneapolis).

Spot-welding for sheets of glass and celluloid, followed by heat and pressure. No. 1,901,574. A. J. Worrall to L. J. Kolb, Phila.

Bituminous-fibre plastic composition, with fillers. No. 1,892,-703. C. T. Lindh to American Rubber Prod. Co.

Phenol

Process for phenol-formaldehyde condensation products. No. 1,892,848. Ostersetzer and Reisenfeld to Pollopas, Ltd.

Method for phenolic condensation products. No. 1,894,088. H. M. Dent, to General Plastics.

Method and apparatus for producing diphenyl. No. 1,894,283. T. J. Scott to Swann Research, Inc.

Process for producing diphenyl with wax-like solid. No. 1,894,266. Durgin and Jenkins, to Swann Research, Inc.

Process for preparation of transparent phenol-formaldehyde resins. No. 1,894,702. Germaine Pechin.

Genesis and reaction from alkyl-phenol esters. No. 1,899,919. M. M. Dvornikoff to Monsanto.

Decomposing condensation products from acetone and cresol for the production of phenolic compounds. No. 1,901,824. Scholler, Jordan and Clerc to Firma S. K. A., Berlin.

Process for purification and vaporizing of crude phthalic anhydride. No. 1,897,110. P. C. Bowers to du Pont.

Plastic Composition

Coating composition of rubber and aminophenol preservative. No. 1,899,120. A. W. Sloan to B. F. Goodrich.

Presses

Press for plastic material. No. 1,893,234. J. L. Hunter to Ahlbell Battery Corp.

Improved hydraulic press. No. 1,895,710. Ernst and MacMillin to Hydraulic Press Mfg. Co.

Improved plastic press. No. 1,899,678. MacMillin and Thorsen to Hydraulic Press Mfg. Co.

Apparatus for molding insulating articles. No. 1,901,205. W. C. Tregoning to Cutler-Hammer, Inc.

Hydraulic press with reversing valve and reciprocating platen. No. 1,901,291. Walter Ernst to Hydraulic Press Mfg. Co.

Resins

Ester resin product and process. No. 1,893,982. T. F. Bradley to Ellis-Foster Co.

Production of ester resins from carboxylic acid and polyhedric alcohol. No. 1,897,977. Carleton Ellis to Ellis-Foster Co.

Completing esterification of alkyd resin by oil glycerid and polyhedric alcohol. No. 1,898,790. P. F. Schlingman to G. E.

Organic acid resin to harden in film, by alcohol and heat to produce resin susceptible to air-hardening. No. 1,898,840. R. H. Kienle to G. E.

New resinous compounds, the aliphatic esters of stearic acid. No. 1,900,638. Carleton Ellis.

Urea

Process for transparent urea-formaldehyde condensation product. No. 1,893,911. Leonard Smidth.

Urea-acetaldehyde-formaldehyde resin. No. 1,896,276. Barsky and Wohnsiedler to American Cyanamid.

Resinous condensation from urea and thiourea, and process. No. 1,897,978. Carleton Ellis to Ellis-Foster Co.

Synthesis of urea through ammonia and carbon dioxide. No. 1,898,093. F. W. Miller to du Pont.

Molding powder of thiourea and formaldehyde. No. 1,899,109. Kurt Ripper, Berlin.

Composition of alkaline solution, acetic aldehyde and paraldehyde with dissolved shellac and urea. No. 1,901,145. P. Ch. Christensen.

Urea-formaldehyde condensation product, and process. No. 1,901,373. Ernst Lionne.

Resins Formed from Cracking Hydrocarbons

Formerly regarded as a useless impurity, the gummy substance with which the vapors of cracked petroleum distillates are contaminated are now being examined with a view to their exploitation in the lacquer and molded products industries. Excellent products are said to be obtained by treating the crude resin with oxidizing agents with simultaneous exposure to ultra-violet light at 150°-300° F., when the original low-melting material undergoes considerable hardening in a comparatively short space of time.

ADVERTISER'S INDEX

Classified Advertising

Rates for classified advertising, per issue, are $1.00 for 20 words or less; 5c for each additional word. 10c for forwarding mail if box number is used. Payment must be enclosed with order, which must be received by publishers no later than the 20th of preceeding month.

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M. C. DEARING OFFERS, in addition to urea condensation products, other products of synthetic resins—applications, compositions, etc.; hot and cold moulding formulae in colors from black to white and for specific uses. Contact desired only with responsible firms having suitable perspective to whom full assurance is offered. P. O. Box 274 Palatine, Ill.

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WANTED: Stock-moulded items suitable for premium and novelty trades. Must sell retail within ten cents. In replying, send samples if possible. Box 605.

And Now, in Closing:—

Beer! Back it comes to trickle down the supposedly virgin throats of a speak-easy generation, putting shellac back in the dictionary under "paints and varnishes." The old-timers may seem to be scornful and unimpressed, but we have yet to see them refuse one "on the house"—and this beer is on the Senate, as well.

One of the tragic twists of fate has delayed the passage of Michigan's—and John Rossiter's—beer bill to a point where the temper of the latter has become as short as his time off!

The new collapsible paper tube has both the cap and shoulder extruded (and who said "molded"?) of phenolic material. This opens up a much wider market, no doubt, but an even bigger one awaits the company who will sell a method of extruding the last inch of paste from the tube. And a method of transfer that would put the cap back in place, after it has gone down the drain, would truly emancipate the morning male.

A new self-polishing shoe leather has been developed by the Mellon Institute. The Greeks, we hear, will have a word for that, too!

In keeping with recent trends, the Pyroxylin Plastics Manufacturers Association (breath) has voted to change its name to the Cellulose Plastics Manufacturers Association (another breath). There is, however, absolutely no truth in the rumor that all companies ending in -oid, such as Elkloid and Asterloid, will now change to -ose.

The article "Deformation in Laminated," by E. E. Halls, was published in our March issue with a certain hesitancy: it was excellent material, but would it be read and understood by the bulk of our non-technical industrial audience? Letters and conversations since it appeared have shown us that it was of definite value to this group of readers, confirming our action in printing it.

"More of these constructive articles, please," was the reaction of one subscriber in the abrasive field. The response comes from Dr. F. N. Peters of the Quaker Oats Company who, in his article in our coming May issue, presents all the facts and formulations on that surprisingly interesting material, FURFURAL. If you want to know how furfural responds in compounds or coatings and its many other practical uses don't fail to read Dr. Peters' contribution.

F. E. Brill, who starts us off this month, should be writing this page in our place. His cases are presented in almost legal form, sharply and with accurate comprehension. We wonder if he has ever occupied an Editor's chair?

It is our hope that the form in which our Technical Abstracts are now presented will be of great service to our readers. In arranging them they have been grouped under headings for easy reference, and only a brief description has been given of the essentials of each patent covered.

The "WE" page in the April "Chemical Markets" has a paragraph that reads as follows:

"During a recent swing around the Mid-west our own publisher arrived in Terre Haute and calling up the Commercial Solvents' offices from the hotel announced to Harry Denny—'This is Haynes'—'Who?'—'Haynes of Chemical Markets and Plastics'. And Denny, who thought he heard 'Haynes of Chemical Markets and *plastered*' cried enviously 'Where did you get it so early in the morning?' "

So that's the reason we didn't go on that trip!

Practically every business man is vitally interested in the present Black bill, now before Congress. Similarly, the action of the Secretary of Labor, Miss Frances Perkins, in requesting autocratic powers for the Department of Labor, is a matter that comes close to the everyday interests of both the average employer and employee. Fundamentally, these measures are designed to bolster present wage scales and unsettled labor conditions throughout the country by fixing a maximum labor week of thirty hours. The Secretary's own request for broad powers would give the Government the right to restrict manufacturers with a view toward mitigating unfair competition by an equal balance of trade among competitive manufacturers.

We are not saying that the present emergency does not warrant some action along these lines. Many manufacturers, however, will remember the War Industries Board that was in existence fifteen years ago; will recall that the Plenary Powers granted at that time provided an effective means of performing industrial stabilization, and will naturally feel that the solution of these ills might best be accomplished through some similar activity on the part of the Government. That Board provided an elasticity of operation that permitted it to function with the greatest efficiency. Crediting the Administration and the Secretary of Labor with all the good motives in the world, it is hard to believe that dictatorial powers with regard to industry generally can ever be satisfactorily administrated. We do not need to go outside of the plastics industry to decide that some form of price and wage maintenance is not only desirable but is, in fact, virtually essential for the healthy progress of the field. The fervent hope of every one connected with the trade is that this progress will not be backward!

Our Editorial Department has just remarked, in the F. P. A. manner, that they have about as much privacy nowdays as a gold standard!

Looking back on page 50 you will recall that a great many of our remaining good corpuscles were in the ascension. Just to prove that, 28 pages later, this still continues, we present a few more extracts from recent letters:

"Accept my sincere congratulations for the greatly improved quality and real value of PLASTIC PRODUCTS"—Curtis I. Kohn, Consultant.

"I have read your new issue and was very favorably impressed."—Douglas Woodruff, President, Auburn Button Works.

"The first copy of your new Journal is what I call a peach of a publication."—M. R. Ximenz, Ch. E.

"Everyone connected with the Plastic Industry should be grateful for your efforts in their behalf in making this organ of their industry what it is."—H. D. Payne, Chicago Molded Products Corporation.
